CLAIMS

1. A process for obtaining porous propylene polymers optionally containing up to 10% by mol of derived units of one or more alpha-olefins of formula CH_2=CHZ wherein Z is H or a C_2-C_{10} alkyl radical, comprising the step of polymerizing propylene and optionally said one or more alpha olefins, under polymerization conditions, in the presence of a catalyst system comprising at least a metallocene compound, said process being characterized in that:
   a) the catalyst system is supported on an organic porous polymer; and
   b) at least part of the polymerization reaction is carried out in the presence of hydrogen.
2. The process according to claim 1 being further characterized in that the polymerization medium is liquid propylene optionally containing minor amounts of an inert hydrocarbon solvent or of one or more comonomer of formula CH_2=CHZ.
3. A process for obtaining a porous propylene polymer optionally containing up to 10% by mol of derived units of one or more alpha-olefins of formula CH_2=CHZ wherein Z is H or a C_2-C_{10} alkyl radical, comprising the following steps:
   a) prepolymerizing propylene optionally with one or more alpha-olefins of formula CH_2=CHZ wherein Z is H or a C_2-C_{10} alkyl radical in the presence of a catalyst system supported on an organic porous polymer, said catalyst comprising a metallocene compound; wherein the polymerization medium is liquid propylene; and
   b) contacting propylene and optionally one or more alpha-olefins of formula CH_2=CHZ wherein Z is H or a C_2-C_{10} alkyl radical under polymerization conditions in the presence of hydrogen and the prepolymerized catalyst system obtained in step a).
4. The process according to claim 3 wherein the polymerization medium in step b) is liquid propylene optionally containing minor amounts of an inert hydrocarbon solvent or of one or more comonomer of formula CH_2=CHZ.
5. The process according to anyone of claims 1 to 4 wherein the organic porous polymer has porosity due to pores with diameter up 10 μm (100000 Å) higher than 0.1 cc/g.

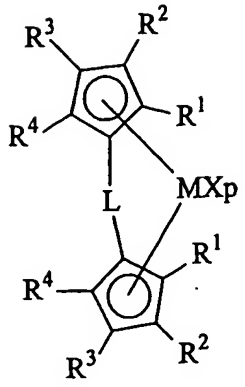
6. The process according to anyone of claims 1 to 5 wherein in the organic porous polymer the total porosity due to of all pores whose diameter is comprised between 0.1 μm (1000 Å) and 2 μm (20000 Å) is at least 30% of the total porosity due to of all pores whose diameter is comprised between 0.02 μm (200 Å) and 10 μm (100000 Å).

7. The process according to anyone of claims 1 to 6 wherein the amount of hydrogen present during the polymerization reaction is more than 1 ppm.

8. The process according to anyone of claims 1 to 7 wherein the catalyst system containing a metallocene compound is obtainable by reacting:
   a) a metallocene compound;
   b) at least an alumoxane or a compound able to form an alkylmetallocene cation; and
   c) optionally an organo aluminum compound.

9. The process according to claim 8 wherein the catalyst system is supported on an organic porous polymeric support according to a process comprising the following steps:
   (a) preparing a catalyst solution comprising a catalyst system;
   (b) introducing into a contacting vessel:
      (i) a porous support material in particle form, and
      (ii) a volume of the catalyst solution not greater than the total pore volume of the porous support material introduced;
   (c) discharging the material resulting from step (b) from the contacting vessel and suspending it in an inert gas flow, under such conditions that the solvent evaporates; and
   (d) reintroducing at least part of the material resulting from step (c) into the contacting vessel together with another volume of the catalyst solution not greater than the total pore volume of the reintroduced material.

10. The process according to anyone of claims 1 to 9 wherein the metallocene compounds belong to formula (I):



(I)

wherein

M is a transition metal belonging to group 4, 5 or to the lanthanide or actinide groups of the Periodic Table of the Elements;

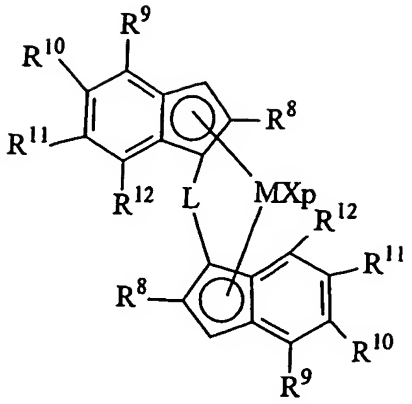
the substituents X, equal to or different from each other, are monoanionic sigma ligands selected from the group consisting of hydrogen, halogen, R^6, OR^6, $OCOR^6$, SR^6, NR^6_2 and PR^6_2, wherein R^6 is a linear or branched, saturated or unsaturated C_1-C_{20} alkyl, C_3-C_{20} cycloalkyl, C_6-C_{20} aryl, C_7-C_{20} alkylaryl or C_7-C_{20} arylalkyl group, optionally containing one or more Si or Ge atoms;

p is an integer equal to the oxidation state of the metal M minus 2;

L is a divalent bridging group selected from C_1-C_{20} alkylidene, C_3-C_{20} cycloalkylidene, C_6-C_{20} arylidene, C_7-C_{20} alkylarylidene, or C_7-C_{20} arylalkylidene radicals optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements, and silylidene radical containing up to 5 silicon atoms;

R^1, R^2, R^3 and R^4, equal to or different from each other, are hydrogen atoms, or linear or branched, saturated or unsaturated C_1-C_{20}-alkyl, C_3-C_{20}-cycloalkyl, C_6-C_{20}-aryl, C_7-C_{20}-alkylaryl, or C_7-C_{20}-arylalkyl radicals, optionally containing one or more heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements; or two adjacent R^1, R^2, R^3 and R^4 form one or more 3-7 membered ring optional containing heteroatoms belonging to groups 13-17 of the periodic table; said rings can be substituted by one or more hydrocarbon radicals containing from 1 to 20 carbon atoms ring optionally containing heteroatoms belonging to groups 13-17 of the periodic table.

11. The process according to claim 10 wherein the metallocene compounds belong to formula (II):



(II)

wherein M, X, L and p have the meaning as in claim 7;

R^8, equal to or different from each other, are linear or branched, saturated or unsaturated C_1-C_{20}-alkyl, C_3-C_{20}-cycloalkyl, C_6-C_{20}-aryl, C_7-C_{20}-alkylaryl, or C_7-C_{20}-arylalkyl radicals, optionally containing one or more heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements;

R^9, R^{10}, R^{11} and R^{12}, equal to or different from each other, are hydrogen atoms, linear or branched, saturated or unsaturated C_1-C_{20}-alkyl, C_3-C_{20}-cycloalkyl, C_6-C_{20}-aryl, C_7-C_{20}-alkylaryl, or C_7-C_{20}-arylalkyl radicals, optionally containing one or more heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements; or they can join to form a condensed 4-7 membered ring.

12. A propylene polymer optionally containing up to 10% by mol of derived units of one or more alpha-olefins of formula CH_2=CHZ wherein Z is H or a C_2-C_{10} alkyl radical having the following features:

- melting point >100°C;
- total porosity expressed as percentage of voids %V/V_1 >15; and
- molecular weight distribution Mw/Mn<4.